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Spin excitations and electron paramagnetic resonance in two-layer antiferromagnetic system Y1-xYbxBa2Cu 3O6+y

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Abstract

An experimental and theoretical study of the EPR spectrum of Y 0.98Yb0.02Ba2Cu3O6.1 is reported. A strong anisotropy of the EPR linewidth is revealed for the parallel and perpendicular orientations of the external magnetic field relative to the tetragonal symmetry axis. This anisotropy is related to the indirect spin-spin interaction between the ytterbium ions via antiferromagnetic spin-waves. The explicit expressions for the coupling of ytterbium ions with the spin waves and the corresponding indirect spin-spin interactions are derived. An estimate of the exchange coupling between the ytterbium and copper ions is found from the comparison of the theory with the experiment.

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